



A mechanism for the recently increased interdecadal variability of the Silk Road pattern

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The Silk Road pattern (SRP) teleconnection manifests in summer over Eurasia, where it is associated with substantial temperature and precipitation anomalies. The SRP varies on interannual and decadal scales; reanalyses show an increase in its decadal variability around the mid-1970s. Understanding what drives this decadal variability is particularly important, because contemporary seasonal prediction models struggle to predict the phase of the SRP. Based on analysis of observations and multiple targeted numerical experiments, this study proposes a mechanism for decadal SRP variability. Causal effect network analysis confirms a positive feedback loop between the eastern portion of the SRP pattern and vertical motion over India on synoptic time scales. Anomalies over a larger region of subtropical South Asia can reinforce a background state that projects onto the positive or negative SRP through this mechanism. This effect is isolated and confirmed in targeted numerical simulations. The transition from weak to strong decadal variability in the mid-1970s is consistent with more spatially coherent interannual precipitation variability over subtropical South Asia. Furthermore, results suggest that oceanic variability does not directly force the SRP. Nevertheless, sea surface temperatures in the North Atlantic and the North Pacific may indirectly affect the SRP by modulating South Asian rainfall on decadal time scales.